

STAR 2006: NOAA Ship *McArthur II* Weekly Science Report

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Science Summary: 28 July through 2 August 2006

Welcome to STAR 2006 aboard the NOAA ship *McArthur II*. The *McArthur II* is headed to Honolulu, surveying in the outer portions of the eastern tropical Pacific (ETP) study area. We have sincerely appreciated the help of the command and crew to get the scientific team up and running on all of our operations. We have an amazing scientific team aboard, including marine mammal observers, seabird observers, an acoustics team, an oceanographer, a flying fish team, and a teacher-at-sea. The marine mammal and seabird observers conduct surveys during all daylight hours from the flying bridge (i.e., the highest deck on the ship). The acoustics team deploys a hydrophone array to listen for marine mammal vocalizations from inside the ship's lab. Physical and biological oceanographic data increases our understanding of the ETP ecosystem; our oceanographer is responsible for many types of sampling, including temperature, salinity, and chlorophyll concentrations at the sea surface and through the water column. She will also conduct net tows for zooplankton, small fish, and invertebrates. Finally, our flying fish team will spend an hour each night using large handheld nets to sample the flying fish community. The teacher-at-sea spends time on the flying bridge and helps with oceanographic operations.

Liberty expired (meaning that everyone had to be aboard) at 0530 on 28 July; however, we didn't go far. We spent the day fueling and at anchor in San Diego Bay, working on calibrating instruments and finishing the set up for operations. We departed the Bay on 29 July at 0900. Everyone was excited to reach the open sea, where we immediately began small boat training. The small boat is used to approach cetaceans for identification photographs and to obtain biopsy samples, which can be used to better understand species distributions and genetics, respectively. The *McArthur II* has a new Miranda Davit for launching the small boat, and we spent time making sure that members of the scientific party who will regularly work in the small boat were comfortable with launching and retrieving operations.

We began marine mammal and seabird surveys that afternoon and immediately found ourselves in the midst of short-beaked common dolphins and blue whales. We were able to obtain photographs of and biopsy samples from the dolphins, which came to the ship to bow ride. The following day remained filled with common dolphins and also included three sightings of *Kogia breviceps* (see the Flying Bridge Report for more details). We then entered a day full of sperm whales, thanks in large part to the acoustics team, which located both of the groups we saw. On the first sperm whale sighting, we successfully launched the small boat, thanks to the deck crew, bridge team, and our coxswain, Kevin Lackey. The animals, however, were skittish and did not allow the boat to approach close enough for sampling.

The last few days the sightings have dwindled, although we did encounter our first group of spotted dolphins. Our Beaufort sea state has increased, making it more challenging to detect animals, and we have entered low productivity waters that typically contain lower densities of animals.

Sightings and Effort Summary for Marine Mammals

Date	Start/ Stop Time	Position	Total nm	Average Beaufort
072906	1440	N32:16.18 W117:24.56	19.6	
	1826	N31:54.95 W117:50.64		
073006	0642	N30:51.65 W118:45.62	93.1	1.6
	1952	N29:19.51 W120:14.38		
073106	0624	N28:23.33 W121:06.14	51.6	3.8
	1945	N27:35.74 W121:50.48		
080106	0648	N26:47.60 W122:35.00	131.9	4.6
	1949	N25:04.03 W124:09.93		
080206	0713	N24:08.02 W124:51.24	114.0	4.6
	1952	N22:30.04 W123:42.93		
080206	0713	N24:08.02 W124:51.24	114.0	4.6
	1952	N22:30.04 W123:42.93		

Code	Species	Number of Sightings
002	<i>Stenella attenuata</i> (offshore)	1
013	<i>Stenella coeruleoalba</i>	2
017	<i>Delphinus delphis</i>	12
018	<i>Tursiops truncatus</i>	1
046	<i>Physeter macrocephalus</i>	4
047	<i>Kogia breviceps</i>	3
051	<i>Mesoplodon</i> sp.	1
070	<i>Balaenoptera</i> sp.	2
075	<i>Balaenoptera musculus</i>	4
079	Unid. large whale	1
177	Unid. small delphinid	2
Total		33

Flying Bridge Report (Richard Rowlett)

Our first week out, the flying bridge setup is complete and operations are running smoothly. Sunday (7/30) and 100 nm due west of Isla de Guadalupe was the kind of day we observers live our whole lives for, a spectacular dead calm morning into mid-afternoon, seas flat and slick as a sheet of glass and a horizon which often was nonexistent as it melted right into the sky making determining distance and size something of a challenge at times.

The marine mammal highlight of the week, and indeed perhaps one of the highlights for the entire STAR2006 cruise were three sightings of pygmy sperm whales (*Kogia breviceps*). Nothing like being in the right place at the right time under such perfect conditions! Had the seas not been so calm, they would have likely been missed. The sightings consisted of two singles and a cow / calf pair. Characteristic of *Kogia*, the animals were rafting very low at the surface for a few minutes and could have easily been passed off as a piece of drift wood or strand of bull kelp, until..., they just simply rolled over and disappeared 'forever' without leaving so much as a ripple. Although not rare judging from the frequency of beach strandings, pygmy sperm whales

are rarely seen at sea and for some of us veterans of 20 or 30 or more years at sea, most of us go many years without ever seeing one and can count up a lifetime's worth of sightings all on one hand.

Also throughout the glassy calm morning, pinnipeds were fairly numerous and widespread, primarily Guadalupe fur seals (*Arctocephalus townsendi*) and one large elephant seal. Loggerhead turtles (*Caretta caretta*) were also abundant, primarily small juveniles; the smallest no larger than a softball. However, once we hit the mid-afternoon 'wind line' and the sea state jumped from 0 to 2, then 3, surely the turtles were still around but we did not see a single one thereafter.

Biopsies (Susanne Yin and Erin LaBrecque)

Species	Common Name	Weekly		Total	
		Samples	Takes	Samples	Takes
<i>Delphinus delphis</i>	Short-beaked common dolphin	2	3	2	3
<i>Turisops truncatus</i>	Bottlenose dolphin	3	3	3	3
Total		5	6	5	6

Photo Project (Isabel Beasley and Jim Cotton)

With the few sightings we have had, the photos have been few and far between. The most interesting photo-id sighting was a group of *Tursiops truncatus*. Initially disguising themselves as spotted/streaker/steno hybrids, they had our observer team questioning their ID until they were actually at the bow and we could see their robust frames, falcate dorsal fins, and numerous cookie cutter shark bites. Our new data entry program, WinPhoto, is great! Thanks to Eric Archer and others for making the photo-id data entry so quick and easy.

Species	Common Name	Weekly	
		Sightings	Photos
<i>Balaenoptera musculus</i>	Blue whale	1	37
<i>Physeter macrocephalus</i>	Sperm whale	1	4
<i>Stenella coeruleoalba</i>	Striped dolphin	2	22
<i>Tursiops truncatus</i>	Bottlenose dolphin	1	34
<i>Delphinus delphis</i>	Short-beaked common dolphin	4	32
Total		9	129

Seabird Report (Michael Force and Sophie Webb)

It took about a week to find our stride, working out the kinks in the system and flushing out the bugs. Thanks to the hard work of our Cruise Leader, Jessica Redfern, and Lead ET Clay Norfleet, all seems to be okay. After our busy first day crossing the California Current out of San Diego, where we found most of the 19 species seen this week, we spent the rest of the week staring at a vast empty void. Fortunately, this year we are recording marine debris at-sea, which keeps us nicely busy. On Sunday, with the seas a flat Beaufort 0, we saw hundreds of Leach's Storm-Petrels, with the expected range in types from those with white rumps to those showing no white at all. Proceeding farther southwest, it was difficult to find any birds at all (how about our grand total of four birds on Monday?). Cook's Petrels (almost all flying west or northwest) and Leach's Storm-Petrels were the commonest birds and we saw a single Kermadec Petrel.

Oceanographic Operations (Melinda Kelley)

In the past few days, I have realized that no matter how much you plan and organize, the gremlins will always be around the corner laughing at you. Despite all of the unpredictable events that have occurred in the past few days, however, oceanographic data are still being collected. We are up and running with a working set of primary sensors on the CTD (thanks to SWFSC Dave Griffith and ET Clay Norfleet), and from our qualitative assessment the profiles look good. We hope to have both primary and secondary sensors for the second leg, so that we can quantitatively verify that the data from both the temperature and salinity sensors are accurate.

XBT casts have been conducted on a regular basis and without any problems thanks to our professional XBT team: Cruise Leader, Jessica Redfern, and Teacher-at-Sea, Cyndy Martin. The profiles are showing some features in the thermocline confirmed by similar features in the CTD profiles.

Net tows have been challenging to get up and running, and I sincerely appreciate the help of many individuals. I would specifically like to thank Kevin Lackey and the bridge team for their patience and assistance. I am hopeful that all of the kinks are now worked out, and expect seamless and efficient tows tonight!

Date	CTD	XBT	Bongo tow	Manta tow
28 July	0	0	0	0
29 July	0	2	1	0
30 July	1	4	1	1
31 July	1	2	1	1
1 Aug	2	3	1	1
2 Aug	2	3	1	1
Total	6	14	5	4

Squeakly Report (Shannon Rankin and Liz Zele)

After two days of twisted and tangled wiring, Liz and I managed to get the basics up and running. On Monday morning, we detected a group of sperm whales not seen by the observers. After 90 minutes of monitoring these deep divers, you can imagine the observers' joy when we informed them in the afternoon that we have a second group of sperm whales. Its no wonder the acoustics team is so loved.

Meanwhile, the pain and suffering of the oceanographers tugged at our heartstrings, and after my previous season of incessant disasters, I could not simply stand by and do nothing. The only proper thing to do was to offer a brief reprieve by taking on the nasty little gremlins myself. The gremlins did a fine job of convincing me that the world was coming to an end, one hydrophone at a time. Tuesday was a day of testing, slicing, and splicing. The oceanographers had a single successful day, until I handed back their stinkin' gremlins (sorry Mindy). We are currently listening to the static-free sounds of the ships prop noise, anxiously awaiting the next set of sperm whale clicks...

Flyingfish News (Jim Cotton)

Not much to report for the week as we zigzag our way south. Sightings of flyingfish during daylight hours were limited to a few California fliers until we crossed the Tropic of Cancer where we were greeted by several large schools of *Exocetus*, the two winged variety, escaping the water in sheets as they fled from our approach.

To date, the only target animals that have been collected during our evening dipping sessions are Myctophids (lantern fish), *Halobates* (marine insects related to water-striders), and a few *Dosidicus* squid.

This season, Howard Goldstein, Isabel Beasley, and Sophie Webb join the ranks of dip netters and squid jiggers. Howie is a promising rookie with a natural swing. We are delighted to have our aquarists and veterans Isabel and Sophie back at the rail.

We look forward to more productive waters and higher diversity as we continue our tack to the south.